

## **REMARKS**

### **I. Introduction**

Claims 8 to 14 are pending in the present application with claim 8 elected for prosecution. In view of the following remarks, it is respectfully submitted that claim 8 is allowable and reconsideration is respectfully requested.

Applicants thank the Examiner for acknowledging the claim for foreign priority and that copies of the certified copies of the priority documents have been received in the national stage application from the International Bureau under PCT Rule 17.2(a).

Applicants thank the Examiner for acknowledging receipt of the USPTO form 1449, Information Disclosure Statement and references contained therein.

### **II. Rejection of Claim 8 Under 35 U.S.C. § 103(a)**

Claim 8 was rejected under 35 U.S.C. § 103(a) as obvious to E.P. 0 533 073 ("Van Swam et al.") in combination with U.S. Patent No. 4,717,427 ("Morel et al.") and U.S. Patent No. 5,832,050 ("Rebeyrolle et al."). Applicants respectfully submit that the combination of Van Swam et al., Morel et al. and Rebeyrolle et al. does not render obvious claim 8 for the following reasons.

Claim 8 relates to a zirconium-based alloy. Claim 8 recites zirconium; and in addition to unavoidable impurities, by weight, from 0.02 to 1% iron, from 0.8% to 2.3% niobium, less than 2000 ppm tin, less than 2000 ppm oxygen, less than 100 ppm carbon, from 5 to 35 ppm sulphur and less than 0.25% in total of at least one of chromium and vanadium, a ratio of a niobium content less 0.5% to an iron content and at least one of not supplemented and supplemented by at least one of a chromium and a vanadium content lower than 3.

The Office Action alleges that Van Swam et al. disclose a zirconium alloy capable of meeting the applicants claimed inventive concept. The Office Action alleges that Van Swam et al. provide a zirconium alloy containing 0-3% niobium, 0-1% tin, 0-0.5% nickel, 0.05-0.20% (500 -2000 ppm) oxygen and the remainder impurities. The Office Action further alleges that it would be inherent that carbon is incorporated in the end product of the alloy. The Office Action admits that Van Swam et al. do not disclose or suggest a zirconium alloy including sulphur in the range of 5 to 35 ppm.

The Office Action merely uses Morel et al. to allegedly provide carbon in an amount between 80 to 270 ppm. The Office Action further merely uses Rebeyrolle et al. to allegedly provide sulphur in an amount between 8 and 30 ppm.

Van Swam et al. allegedly relate to structural elements for nuclear reactor fuel assemblies. Title. Van Swam et al. do not disclose or suggest the incorporation of sulfur into the alloy matrix. Moreover, Van Swam et al. are deficient in not specifically noting that a ratio of a niobium content is less 0.5% to an iron content and at least one of not supplement and supplemented by at least one of a chromium and a vanadium content lower than 3. Van Swam et al., in fact, only provide broad ranges of elements including an optional content of iron and chromium. Furthermore, vanadium is not discussed in Van Swam et al. Van Swam et al. provide no evidence or discussion that providing a ratio of elements a niobium content is less 0.5% to an iron content and at least one of not supplement and supplemented by at least one of a chromium and a vanadium content lower than 3 would provide for the unexpected benefits of providing a face centered cubic configuration and a hexagonal lattice which has a favorable resistance to corrosion in lithium-containing water.

Applicants also respectfully traverse the unsubstantiated conclusion that Van Swam et al. would provide that carbon would be inherently present in the end product of the alloy. Applicants respectfully submit that the incorporation of carbon in the zirconium sponge does not indicate that carbon would be present in the strictly limited concentrations required for an alloy and a final product according to the invention.

Applicants respectfully further submit that the addition of the Morel et al. reference does not cure the defects of Van Swam et al. Morel et al. allegedly provide a method of manufacturing zirconium alloy plates. Title. Morel et al. specifically relate to only alloys of "Zircaloy 4". Col. 2, lines 4 to 8. Therefore, any combination of Morel et al. with another reference would be related to the subject matter disclosed or suggested in Morel et al., namely materials of Zircaloy 4. Morel et al. provide that Zircaloy 4 has nominal contents of about 1.5% Sn, 0.21% Fe and 0.1% Cr, however Applicants respectfully submit that Zircaloy 4 does not have niobium, a specified component in the current invention. As a consequence a person of ordinary skill in the art would only combine Morel et al. with a reference that has a similar teaching. Van Swam et al., however, relates to alloys that contain niobium, a contrary teaching to

Morel et al. Applicants furthermore submit that the alloys of Morel et al. are only applicable to compositions which are rich in tin content, unlike the present applications claim 8. Applicants furthermore submit that carbon in the present invention is an impurity, the content of which must be kept as low as possible since a minimal content is not required. Morel et al., however, are only applicable to carbon containing materials in a specified range. Morel et al. do not disclose or suggest any advantageous effect on mechanical or other properties in the limitation of carbon as required in the current application. Morel et al. provide no evidence or discussion that providing a ratio of elements a niobium content is less 0.5% to an iron content and at least one of not supplement and supplemented by at least one of a chromium and a vanadium content lower than 3 or any of the advantages of such a relationship.

The addition of Rebeyrolle et al. does not cure the defects of Van Swam et al. and Morel et al. Rebeyrolle et al. provide no evidence or discussion of providing a ratio of elements a niobium content is less 0.5% to an iron content and at least one of not supplement and supplemented by at least one of a chromium and a vanadium content lower than 3. Rebeyrolle et al. are silent that such a provision would provide for face centered cubic configuration and a hexagonal lattice which has a favorable resistance to corrosion in lithium-containing water. Rebeyrolle et al., contrary to the requirements of the present application, pertain to alloys which have differing compositions than the composition required in claim 8 and a person of ordinary skill in the art would not have combined the references.

Applicants respectfully submit that the combination of references does not disclose or suggest the features of claim 8 and that the rejection should be withdrawn.

### **III. Rejection of Claim 8 Under 35 U.S.C. § 103(a)**

Claim 8 was rejected under 35 U.S.C. § 103(a) as obvious to W.O. 93/15205 ("Garde") in combination with U.S. Patent No. 4,717,427 ("Morel et al.") and U.S. Patent No. 5,832,050 ("Rebeyrolle et al."). Applicants respectfully submit that the combination of Garde, Morel et al. and Rebeyrolle et al. does not render obvious claim 8 for the following reasons.

The Office Action alleges that Garde discloses a zirconium alloy which provides 0 to 1% niobium, 0 to 1% vanadium, .2 to .5% iron, 0.1 to 0.4% chromium and

0 to 2200 ppm oxygen with the remainder impurities. The Office Action admits that Garde does not disclose any addition of carbon or sulphur to the zirconium alloy.

The Office Action merely uses Morel et al. to allegedly provide carbon in an amount between 80 to 270 ppm. The Office Action further merely uses Rebeyrolle et al. to allegedly provide sulphur in an amount between 8 and 30 ppm.

Garde provides only broad ranges of materials that are to be included in the final product alloy. Garde provides no evidence or discussion of a ratio of elements wherein a niobium content is less 0.5% to an iron content and at least one of not supplemented and supplemented by at least one of a chromium and a vanadium content lower than 3. Garde, in fact, provides for niobium concentrations of only up to 1%. Garde does not disclose any addition of carbon or sulphur to the zirconium alloy. Moreover, Garde requires a typical chromium content of .25%, greater than the requirement of claim 8 of less than .25% in total of at least one of chromium and vanadium.

Applicants respectfully further submit that the addition of the Morel et al. reference and Rebeyrolle et al. does not cure the defects of Garde. Both Morel et al. and Rebeyrolle et al. provide no evidence or discussion of a ratio of elements wherein a niobium content is less 0.5% to an iron content and at least one of not supplemented and supplemented by at least one of a chromium and a vanadium content lower than 3 and therefore. Morel et al. and Rebeyrolle et al. merely provide discussion pertaining to carbon and sulfur respectively and there is no disclosure or suggestion that these references would be combined by a person of ordinary skill in the art with Garde to provide the features of claim 8.

As the combination of references does not disclose or suggest the features of claim 8, Applicants respectfully request withdrawal of the rejection to claim 8.

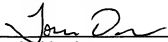
**IV. Conclusion**

It is respectfully submitted that the pending claim is allowable. All issues raised by the Examiner having been addressed, an early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

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